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ABSTRACT

To determine how much electronic writing-analysis programs can offer college students and how valuable computerized text actually is, nine college student essays and nine professional essays were analyzed using text editors. The student essays (three each rated "superior," "average," and "failed") and the professional essays (three each by William Jennings Bryan, John F. Kennedy, and Abraham Lincoln) were subjected to electronic text analysis using Writer's Workbench and MacProof. Writer's Workbench, the oldest and most highly-developed text analysis program currently available to students, is capable of analyzing writing for 30 different traits. The MacProof program, version 2.0, runs on the MacIntosh personal computer and was used because of its wide availability and similarity to Writer's Workbench. Data on all student and professional essays pertained to a number of criteria, including spelling, sentence length/structure, number of "to be" verbs, and number of words. The Writers Workbench reports were superior to the MacProof reports for all 18 papers on all writing qualities studied except for spelling and "be" forms. In contrast, MacProof's writing analysis reports were limited in scope and usefulness. Data on readability, sentence length, and frequency of use of "to be" verbs proved helpful, but, overall, the text analysis reports were misleading and overly simplified. The text analysis programs simply did not address the many key elements of student writing evaluated by even the most inexperienced of writing teachers. (AEW)

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The Effectiveness of Writer's Workbench and MacProof

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In today's world, announced connections between computers, composition, and composition processes are many. Advertised computerized pre-writing resources include programs such as Calliope, Comparing Subtopics, Eliza, First Draft, Homework Helper, Interactive Writing Tools, Organize, Prewrite, Proteus, Quest, Quill, Seen, Thinkworks, Topoi, and Visual Synectics. Available Word Processing programs include some plain ones (such as Bank Street Writer, Homeword, and Magic Slate) and some complex, sophisticated ones (such as Appleworks, Displaywrite, MacWrite, Microsoft Word, Nota Bene, WordPerfect, and Word Star.) Current writing checkers and editing programs are equally numerous. A list of twenty text analysis programs would perhaps include the following names: Buster, Catch, Comment, Epistle, Grammatik, Homer, MacProof, Outliner, Punctuation and Style, RightWriter, Sentence Combining, Styled, Thelma Thistleblossom, Tools for Writers and Writer's Workbench. Current integrated software trying to combine prewriting, writing, revising, and text analyzing and commenting features into a single package includes The Computer Writing Resource Kit, The HBJ Writer,

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Wordswork, The Writer's Helper, and The Writing Workshop. In addition to these programs, currently being marketed is a long list of supplementary drill and practice software including programs such as Caret Patch, Composition I and Composition II, Connections, Grammar Examiner, GrammarLab, M-ss-ng L-nks, Punctuation Put On, SAT Drill, Suspect Sentences, TICCIT English, Verbal Calisthenics, and Writing Lab. (1)

Obviously today's college writers live in a world teeming with computerized writing programs and composition aids--more than fifty are named above. Not so obvious, however, is the fact that use of these programs is based more on opinion and testimony than on research findings and demonstrated values. Granted, limited research on word processing is taking place, and those who use it know how fast and amenable to alterations electronic writing is. Current word processing research shows that word processing is an invaluable aid to writing and revising and is an important catalyst to improving student attitudes about writing. (2) Nonetheless, few researchers have attempted to determine the values and roles of electronic prewriting or computerized text analysis aids as facilitators and enhancers of student discourse. (3)

Daiute, for example, discusses four strategies and several computer programs that purport to help students retrieve information from their "internal libraries." (4) But do they? How effective are these prewriting techniques and computer aids? In which ways? How do we know? And if there is evidence that computers facilitate idea discovery and insight formulation

during the prewriting process, do computer programs perform this task better than, the same as, or worse than other non-electronic activities such as in-class talk-write exchanges, group writing, and in-class discussions before writing an assignment? As users of electronic media and as teachers of composition, we must ask ourselves these kinds of questions because years of experience and research suggest that students are often able to say aloud that which they can not write. (5)

Similarly, a great need exists today to investigate the usefulness of electronic writing checkers and text analyzers. In 1966, Page argued and demonstrated that some features of language can be measured by computers. (6) He also demonstrated that computer tabulations of attributes of writing (e.g. sentence length, number of subordinating conjunctions, number of words written) correlated well with the grades given papers by four different judges. Five years later, Finn developed data on the probability of given words or word choice appearing in the discourse of writers of different ages. (7) The early research of Page, Finn, and others did three things: it heightened our awareness of the variables that humans and machines can measure and respond to in analyzing writing; it provided the first computer reports that students could use to check on their writing as one would use a second reader; and it provided students with specific suggestions for possible revison of their discourse. (8)

More recently, in discussing electronic writing-analysis programs, Daiute asks whether today's text analysis programs

sometimes or most of the time know less or more than the people writing the papers know. (9) If text analysis programs are woefully limited, knowing for example much less than children know about writing and language, how can the programs converse with the youngsters and prompt improved writing? The problem is greatly magnified when we pose this question in terms of intellectually mature college students. Are today's electronic text analyzers capable of helping mature college students write better? How? In which ways? How do we know? These are important questions looking for definitive answers.

Further, Helen Schwartz calls today's electronic writing aids "training wheels." (10) Is this metaphor more or less appropriate than calling computer writing aids "bicycles without brakes, sprockets, and handle bars?" The appropriateness or inappropriateness of either metaphor needs to be investigated, clarified, and justified. Do students using a specific text analysis or writing checker program really benefit from the text analysis reports they get on the papers they write? Can it be demonstrated that electronic text analysis programs provide meaningful feedback and comments that actually improve the effectiveness, quality, and final grades of student papers?

The availability of many text editing programs today suggests that at least some composition teachers and students accept the assumption that computerized text analysis programs do improve student writing processes and products. For the most part, however, even if we do assume that text analyzers do aid student writers as training wheels aid novice bike riders, we

must realize that the specific values and influences of specific computerized writing aids have not been determined yet. A great need exists, therefore, to investigate the roles and values of electronic writing-analysis programs through careful, documented research. (11) Further, teachers using computers to teach composition usually adopt two premises upon which they base their instruction. (1) Computers help students write better than they would write without computers; and (2) Computers will save students and teachers time in the evaluation process.

Statement of the Problem. The major questions asked in this study are four: (1) "Do the text analysis reports obtained from two different computer programs, Writer's Workbench and Macproof, help students improve the grades they receive on their papers? (2) "Which writing analysis reports, those from Writer's Workbench or those from Macproof, prove most meaningful to student text revision?" (3) "What electronically-obtained data have most implications for college or university writing? And, finally, (4) "How informative and valuable are computerized text analysis reports obtained from the works of William Jennings Bryan, John F. Kennedy, and Abraham Lincoln?

Procedures. Nine college student essays and nine professional essays were selected for analysis. Student discourse consisted of three superior freshman essays (three papers awarded "A" grades by two different college composition teachers); three average freshman essays (three papers given

"C's" by the same teachers); and three failed freshman essays (three papers graded "F" by the teachers). The writing teachers read the papers, made comments, and gave grades according to the procedures they had established in the past fifteen (Teacher #1) and twenty-five years (Teacher #2) of college service. Both composition teachers have been trained in and have used holistic evaluation of student writing for five years in their teaching.

In addition, for purposes of comparison, three works of William Jennings Bryan (#1, the 1896 Platform Speech; #2, the 1894 Speech on Income Tax; #3, the 1894 Memorial Address on our Nation's Dead); three works of John F. Kennedy (#1, the 1963 Nuclear Test Ban Speech; #2, the 1961 Policy on Cuba Editorial; and #3, the 1961 Inagural Address); and three works of Abraham Lincoln (#1, the 1863 Emancipation Proclamation; #2, the 1863 Gettysburg Address; and #3, the 1865 Second Inagural Address) were selected for electronic text analysis in this study. The works of Bryan, Kennedy, and Lincoln were selected because of their recognized popularity, representativeness, and rhetorical effectiveness.

Two text analysis programs were used in this study, Writer's Workbench and Macproof. The grandfather of text analysis programs, Writer's Workbench is the oldest and most highly-developed text analysis program currently available to college and university students. The program runs on a Unix system and requires texts to be in dos format for analysis. The program is capable of analyzing writing for thirty different traits. These traits can be studied by giving a single command, initiating a

report on a single trait or asking for a report on all thirty traits at one times. Thirty trait analyses require five minutes for a one thousand word document. Additional time must be allowed for printing and retrieving reports.

The Macproof text analysis program, version 2.0, runs on the stand--alone Macintosh Plus personal computer. It was used in this study because of its wide availability and its similarities to Writer's Workbench.

Analysis of Data. Printouts for the nine student and nine professional essays were obtained from Writer's Workbench and Macintosh text analyses conducted by the researcher at Brigham Young University. Data on all student and professional essays were summarized on: spelling accuracy; readability; sentence length and sentence structure; number or to be verbs, passives, and nominalizations; sentence openers; word choices and revisions; and number or words. Arithmetic comparisons were made between student and professional writing and among superior, average, and failing college writing. All computer reports, suggestions for student revision, were considered for all papers on both Writer's Workbench and Macintosh analysis programs. Judgments made in this paper were based on the assumption that students read and successfully followed the suggestions for revision given them by the two computer programs studied.

Research Findings. The first question asked in this study was "Do electronic text analysis reports," if understood and

followed, "improve college students' grades on essays?" The findings in this study suggest three major values of computer analysis: identifying possible spelling errors, determining sentence length averages or readability levels, and calculating the percentage of to be verbs used in papers.

The two spelling checkers in this study successfully identified most incorrectly spelled words in all 18 papers. Nevertheless, they failed to identify all misspellings in all papers. As expected, the checkers did not flag the homonyms, confused and misused words the teachers found in the student texts--errors such as them for then, lose for loose, and affect for effect (student paper #1). Such spelling errors accounted for 7% of the misspellings in the student papers. More important, both the Macproof and Writer's Workbench spelling checkers suggested three times more misspelled words than texts actually had because of many hyphenated words. Bryan's paper #3, for example, reported 34 possible misspellings, most hypenations; Kennedy's paper #1 had 37 words flagged, and Lincoln's paper #3 had 19 words flagged, again the majority due to hypenations.

Readability and sentence length levels proved meaningful in this study. The three different works of Bryan, Kennedy, and Lincoln all averaged grade 12 on the readability scales in Writer's Workbench. The three "A" student essays averaged grade 10, the "C" essays grade 8, and the failed papers grade 7, suggesting that reading level could be related to effective college writing in a significant way. Similarly, the three professional writers averaged 32 words per sentence in this

study; the average sentence length of the students was 16 words.

"Be" verb counts proved meaningful also. The works of Bryan, Kennedy, and Lincoln contained an average of 27% "be" forms, one be verb out of four verbs used. The student essays showed irregular "be" ratios. Superior student papers averaged 42%, "C" papers 39%, and failed papers 49%, the latter group using be verbs half the time.

As insightful as it is, however, the above computer-generated data is quite limited compared to the written comments the teachers made on the student papers in this study. Teacher comments on the failed student papers suggest, for example, that all three "F" papers lacked a definite purpose or thesis, and thus, lacked effective organization as well. One paper, from beginning to end, did not have a specific focus. Another failed paper was unusually illogical and opinionated. This same paper contained three fragments as well as several unclear and illogical sentences. All three papers were undeveloped and all three generally appeared to be unfinished attempts at pre-writing--not serious, revised, thoughtful, finished papers. The "C" papers in this study presented some similar and some different problems. Two of the three papers lacked crispness of expression. One contained several one-sentence paragraphs; many ideas in this paper were simply unclarified and general. None of the nine student essays, however, contained more than one major grammatical error other than one paper which had fragments.

In comparing the teacher comments with the computer reports on student papers, this researcher concluded that the computer

reports given students did not begin to approach the key weaknesses and strengths of the freshmen writing. Without question, the teacher comments would help students improve their grades more than the computer comments in this study. Further, electronic text analysis reports are misleading and overly simpllified. The computer analyses and reports in this study simply did not comment on scores of basics related to writing such as as audience, purpose, organization, quality of ideas, development, logic, method of organization, and tone implications in discourse. Moreover, what computer analyses do say often proves misleading. Had Bryan followed the advice of the computer analysis on his Income Tax speech, for example, he would have changed five correctly punctuated sentences to sentence fragments because the word percent was spelled per cent. The period caused the computer to tell the writer that the next word after the period on cent had to be capitalized. Lincoln was encouraged to omit "rather" in his "It is rather for us the living. . . ." in the Gettysburg Address because rather, like sort of and kind of, is a vague word. In this instance, however, Lincoln uses the word rather effectively and well as a transitional, not vague, word. Comments on student texts reflected this same tendency and lack of discrimination. Thus, the level of sophistication of computer analysis programs, even the best, is questionable.

The second question studied in this research report asked, "Which text analysis reports are most meaningful to students, those from Writer's Workbench or those from Macproof?" Without reservation, in this study the Writer's Workbench reports were

superior to the Macproof reports on all eighteen papers, on all writing qualities studied except for spelling and "be" form listings. Writer's Workbench provided information on thirty different dimensions of student writing, Macproof fewer than ten. Writer's workbench provided information on spelling; readability (four different measures); sentences (number, length, longest, shortest; percentages of simple, compound, complex, compound-complex); sentence openers (prepositions, adverbs, verbs, subordinating conjunctions, conjunctions and expletives); verbs (to be forms and passives); nominalizations; number of total words written; and suggested revisons (an average of one suggested revision for every 50 words written by college students and an average of one revision for every 125 words written by professionals).

In contrast, Macproof's writing analysis reports were limited in scope and meaningfulness. Macproof checks student writing for Mechanical Errors (spelling, punctuation, capitalization, and double words); for Usage Errors (Sexist and racist terms, confused terms--like there and their; vague terms; overworked terms; discouraged terms); for Style Errors ("be" verbs and nominalizations) and for Structure (paragraph structure review and sentence structure review. The only Macproof Mechanical Errors check found meaningful in this study was the spelling checker. The punctuation, capitalization, and double words check provided no or almost no information for all 18 papers studied. Nor did the did the usage items--sexist, racist, confused, vague, overworked, and discouraged terms. Most student

reports on these items simply read, "No data to display." Further, the Macproof glossary of usage contains only twenty four sets of confused words the computer searches for, words such as their and there. This corpus of data is woefully inadequate and misleading. Some misused words Macproof did not catch in student writing because Macproof has not included them in the glossary. Students would have to be quite naive to think that because they checked their papers for misused words using Macproof, their essays were correct. Yet such thinking is spawned by some computer programs.

Macproof's list of "be" verbs is its most beneficial report, for the "be" verb is listed in context with text preceding and following it, allowing students to focus specifically on strengthening their verb choices. Macproof's abridgement feature allows students to print the first and last sentence in each of their paragraphs. Macproof's expansion feature allows students to print each sentence in their text. Both of these features are redundant. Students do not need computers to review their papers in such a manner, and key data on sentence length, number of words, structure of sentences, and types of sentence openers, available on Writer's Workbench, is not available on Macproof.

The third question in this study involves the values of text analysis programs. Text analysis programs such as Writer's Workbench do provide meaningful data that have implications for college and university writing. Their limited, qualified ability to search for possible misspellings is their most basic function, yielding the most success. Next, readability and average

sentence length data is meaningful. Such information suggests which writing is more and which is less mature than targeted levels of discourse. In addition, having more than 25% be verbs in general writing indicates possible ineffective discourse. General writing containing half be verbs appears to be inferior. Further, the total number of words written in a paper is meaningful. Students who wrote "A" papers in this study wrote papers averaging 575 words; "average" papers averaged only 333; "F" papers averaged only 275 words each. These data suggest something important about development and substance in student essays. Perhaps there is some validity to the practice of throwing student papers down a staircase and giving A's to those that sail the farthest. In addition, the rewriting suggestions given students on Writer's Workbench show that professional writers need to revise far less than their student counterparts. Bryan, for example, was encouraged to revise his writing one time for every 132 words; Kennedy, once in every 131 words; and Lincoln, once in every 122 words. In contrast, the "A" students in this study were urged to revise their writing one time for every 34 words, four times the numbers of revisions recommended for professional writers. Finally, in this study no evidence was found to justify checking anyone's writing for nominalizations. Bryan, Kennedy, and Lincoln averaged two percent nominalizations in their writing as did all three student groups. Also, data on different kinds of sentence openers proved similar for all groups of writers, professionals as well as students, totals showing no significant differences.

Finally, how informative is the electronic text analysis data obtained on the works of Bryan, Kennedy, and Lincoln? This study provides several interesting bits of information. Bryan and Lincoln, for example, have sentences in their works as long as 174 (B#1) and 197 (L#1) words whereas Kennedy's longest is 81 words (K#3), this variation due to the liberal use of the colon and dash in Bryan and Lincoln and its non-use in Kennedy. More important, sentence structures in Bryan, Kennedy, and Lincoln are far more varied, more complex, and more substance oriented than are the sentences in the freshman writing studied. The readability and average words per sentence summaries support this observation. Further, the revision data compiled in this study on Bryan, Kennedy, and Lincoln suggest that their writing is far more polished and less prone to correction than student writing.

In conclusion, this study fails to support today's electronic writing analysis reports as major aids to writing improvement. Although text analysis reports appear to provide limited, but meaningful, insights about and suggestions for revising student writing, most text analysis programs simply do not address the many key elements of student writing evaluated by even the most inexperienced of the inexperienced writing teachers. We must remember that writing abilities, like icebergs, lie ninety percent under the surface, and what lies under the surface, as well as that which lies above the surface which we try to observe and measure, must not be overlooked or ignored. Computerized writing programs appear to investigate and comment on the tips of icebergs only and that only superficially.

END NOTES

1. The programs listed here are drawn mainly from three different sources and listed alphabetically in the text: Peter Adams and Janie Hydrick, Software Resources, Assembly on Computers in English, November, 1986, 8 pages; Colette Daiute, Writing and Computers(Reading, Mass.: Addison-Wesley Publishing Company, 1985), pp. 300-320; and Bonnie Sunstein, "A Sampling of Software for the Writing Center," Writing Lab Newsletter, January, 1987, pp. 2-5.

2. See the recent issues of and bibliographies in Research in Word Processing Newsletter(Rapid City, South Dakota: South Dakota School of Mines and Technology). Cf. Brian Gallagher, "Computers, Word Processors, and the Teaching of Writing," 3(No. 4), April, 1985, pp. 1-6; Gail E. Hawisher, "Studies in Word Processing," Computers and Composition, 4(No. 1), November, 1986, pp. 6-31.

3. Since the first edition of Computers and Composition in November, 1983, not more than three or four research reports on prewriting and text analysis programs have been published in this or other journals combined.

4. Daiute, pp. 73-98.

5. See Terry Radcliffe, "The Task-Write Composition: A Theoretical Model Proposing the Use of Speech to Improve Writing," Research in the Teaching of English, 6 (Fall, 1972), 189-199. See also Robert Zoellner, "Talk-Write: A Behavioral Pedagogy for Composition," College English, 30(January, 1969), 267-320. Many forms of talk-write activities are now used in writing classrooms.

6. Ellis B. Page, "The Imminence of Grading Essays by Computer," Phi Delta Kappan, 47 (1966), 238-243.

7. Patrick J. Finn, "Computer-aided Description of Mature Word Choices in Writing," in Charles R. Cooper and Lee Odell, Evaluating Writing: Describing, Measuring, Evaluating(Urbana, Illinois: National Council of Teachers of English, 1977), pp. 69-89.

8. Finn, p. 71.

9. Daiute, p. 189.

10. Ibid.

11. See the Suggestions for Research section at the end of this paper.